

**AMENDMENTS TO THE CLAIMS**

**Claims 1-3 (Canceled)**

**Claim 4 (Withdrawn)** A reactor system comprising:

a reactor for producing an aromatic carboxylic acid and water from an alkyl aromatic compound in a solvent containing acetic acid, and for generating a vapor mixture of a solvent and water;

a first separation membrane for separating said vapor mixture, which is discharged from said reactor, into a first permeable vapor mainly comprising a first component and a first nonpermeable vapor mainly comprising a second component;

a second separation membrane for separating said first permeable vapor, which is discharged from said first separation membrane, into a second permeable vapor mainly comprising the first component and a second nonpermeable vapor mainly comprising the second component; and

a return passage for condensing said first nonpermeable vapor and said second nonpermeable vapor and returning the thus condensed first and second nonpermeable vapor into said reactor.

**Claim 5 (Withdrawn)** The reaction system of claim 4 wherein said solvent containing acetic acid is acetic acid, said alkyl aromatic compound is paraxylene, and said aromatic carboxylic acid is terephthalic acid.

**Claim 6 (Withdrawn)** The reactor of claim 4 further comprising gas-liquid separators each provided between one of said first and second separation membranes and said return passage for separating terephthalic acid from said first and second nonpermeable vapors.

**Claims 7-19 (Canceled)**

**Claim 20 (Previously Presented)** A separation system comprising:

a distillation column into which a mixture of a first component mainly comprising water and a second component mainly comprising nonaqueous substances is supplied;

an overhead vapor supply pipe connected to a top of said distillation column;

first and second branch pipes branched from said overhead vapor supply pipe;

a superheater connected to said first branch pipe;

a separator provided downstream of said superheater and including a separation membrane for separating overhead vapor discharged from the top of said distillation column into a permeable vapor which mainly comprises said first component and a nonpermeable vapor which mainly comprises said second component by allowing only a selected portion of said overhead vapor to permeate said separation membrane; and

a reflux unit comprising a condenser connected to said second branch pipe for cooling a portion of said overhead vapor into a liquid and a gas-liquid separator for separating gas from the liquid produced by cooling in said condenser and returning the thus separated liquid into the top of said distillation column.

**Claim 21 (Previously Presented)** The separation system of claim 20 wherein said distillation column includes fluidized beds.

**Claim 22 (Previously Presented)** The separation system of claim 20 wherein said separation membrane comprises an inorganic porous member comprising a porous ceramic substrate, and a silica gel layer comprising a silica gel membrane carried on the surface of the porous ceramic substrate or in the pores of the porous ceramic substrate.

**Claim 23 (Currently Amended)** A separation system comprising:

a distillation column into which a mixture of a first component mainly comprising water and a second component mainly comprising nonaqueous substances is supplied;

an overhead vapor supply pipe connected to a top of said distillation column;

first and second branch pipes branched from said overhead vapor supply pipe;  
a superheater connected to said first branch pipe;  
a first separator provided downstream of said superheater and including a first separation membrane for separating overhead vapor discharged from the top of said distillation column into a permeable vapor which mainly comprises said first component and a nonpermeable vapor which mainly comprises said second component by allowing only a selected portion of said overhead vapor to permeate said separation membrane;

a second separator including a second separation membrane for separating said first permeable vapor into a second permeable vapor which mainly comprises said first component and is higher in the concentration of said first component than said first permeable vapor, and a second nonpermeable vapor which mainly comprises said second component, by allowing only a selected portion of said first permeable vapor to permeate said second separation membrane; and

a reflux unit comprising a condenser connected to said second branch ranchr pipe for cooling a portion of said overhead vapor into a liquid, and a gas-liquid separator for separating gas from the liquid produced by cooling in said condenser, and returning the thus separated liquid into the top of said distillation column.

**Claim 24 (Previously Presented)** The separation system of claim 23 wherein said first and second separation membranes each comprise an inorganic porous member comprising a porous ceramic substrate, and a silica gel layer comprising a silica gel membrane carried on the surface of the porous ceramic substrate or in the pores of the porous ceramic substrate.